NORTHERN HARRIER
Circus cyaneus

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Management Status: Federal: None
California: Species of Special Concern (CDFG, 1998)

General Distribution:

The Northern Harrier (called "Hen Harrier" in the English-speaking Old World, and formerly called "Marsh Hawk" in North America) breeds across North America and Eurasia, south in the New World to northwestern Baja California, the southern Great Plains and the mid-Atlantic Coast. The northern populations are migratory, with the species' winter range extending north in North America to southwestern and southeastern Canada, the central Great Plains, Pennsylvania, and southern New York. Some winter as far south as Panama and the Greater Antilles (rarely south to northernmost South America).

In California this harrier is a local and declining breeding species (Grinnell and Miller, 1944; Garrett and Dunn, 1981). Grinnell and Miller (1944) cite breeding localities over much of the state, including the interior from Siskiyou County south to western Riverside and San Bernardino Counties and coastal regions from Marin County to San Diego County. Garrett and Dunn (1981) cite the following breeding localities current as of about 1980 in the interior of southern California: the Owens Valley (Inyo County); Lakeview (Riverside County); Harper Dry Lake (San Bernardino County); and probably the Antelope Valley (Los Angeles County). Most former nesting areas along the coast had been deserted by the 1970s, with current nesting only in coastal San Luis Obispo and San Diego counties (Garrett and Dunn, 1981).

The Northern Harrier is a widespread migrant and winter visitor through California. Fall migrants may be noted as early as late August, and this species is numerous away from breeding areas by late September; wintering birds may be present through March and often until mid-April (Garrett and Dunn, 1981). An estimated 13,200 birds winter in California (MacWhirter and Bildstein, 1996).

Distribution in West Mojave Planning Area:

Regular breeding is limited in the WMPA to Piute Ponds on the Edwards Air Force Base and Harper Dry Lake. At Piute Ponds this species has been present through the spring and suspected of nesting since at least 1980 (K.L. Garrett, unpubl. data). Nesting was confirmed in May 1992 when a nest with six eggs was discovered by L.F. Kiff (Los Angeles County Museum files). At least three pairs of Northern Harriers are suspected of nesting at Piute Ponds through the 1990s (K.L. Garrett, unpubl. data). Nesting pairs at Piute Ponds occupy extensive bulrush (*Scirpus*) marshes and adjacent dense, wet grasses and sedges bordered by saltbush (*Atriplex*) scrub. Northern Harriers

have been seen widely in the western part of the Edwards Air Force Base in Kern and Los Angeles counties (Air Force Flight Training Center Environmental Management Office, 1993), but nesting on the base is probably restricted to Piute Ponds.

Northern Harriers occur commonly throughout the year and nest regularly at Harper Dry Lake (ENSR, 1989); the breeding population there is estimated at two to four pairs. This species may also nest in other marshy wetlands in the WMPA, at least after wet winters.

It is possible that Northern Harriers may occasionally nest (particularly after wet winters?) in agricultural or grassland areas elsewhere in the WMPA. For example, an adult male was observed in an agricultural area dominated by alfalfa on 24 May 1980 about 15 miles (24 km) east of Lancaster in the Antelope Valley (K.L. Garrett, pers. obs.). This is well after wintering birds and transients have departed in spring.

In winter this species is recorded annually on the Lancaster Christmas Bird Count, with a minimum count of 13 individuals, a maximum of 62, and a mean count of 34.1 between 1979 and 1996 (F. Heath, in litt.). In the northern WMPA it is considered common in winter at China Lake NWC (California Natural Diversity Database); recent Christmas Bird Counts at China Lake have recorded four to eight harriers (*American Birds/National Audubon Society Field Notes*). This species is fairly common through the winter in the Mojave Narrows/Victorville/Hesperia area (S.J. Myers, unpubl. data), with recent records for this area falling between 19 September and 17 February; Northern Harriers are regularly recorded on the Mojave River Valley Christmas Bird Count (*American Birds/National Audubon Society Field Notes*).

Fall migration through the region is mainly in September and October. Intensive monitoring of migrant raptors south of Weldon (Kern Co.) in the southern Sierra Nevada during 1994 yielded thirteen Northern Harriers between 13 September and 17 October, giving an indication of the species' fall migration period (Rowe and Gallion, 1996). There is no clear period of spring migration through the WMPA, but wintering birds largely depart by mid-April.

Natural History:

Northern Harriers are moderately large raptors with rather long, narrow wings, a long tail, and a striking white band on the upper tail coverts. Length varies from 16-20 inches (41-50 cm), and wingspread is 38-48 inches (97-122 cm; Clark and Wheeler, 1987). Females are considerably larger and heavier than males, with the mass averaging 513 g in the breeding season, vs. 336 g for breeding males (MacWhirter and Bildstein, 1996). This species is strongly dimorphic in plumage. Adult males are primarily pale gray on the head, breast and upperparts, and white below; in flight they show black wingtips and white uppertail coverts. Females are brown on the head, breast and upperparts and buffy below with dark streaks; they also show white uppertail coverts. Immatures generally resemble adult females but are a deeper, ruddier brown in coloration.

Harriers have a distinctive slow, buoyant flight, with the wings raised in a slight dihedral; when foraging they often fly within a few feet of the ground.

The diet is usually dominated by rodents. Breeding season data (MacWhirter and Bildstein 1996) show that about 70% of prey delivered to nestlings consists of rodents over most of the species' range, although one study in California (Selleck and Glading,

1943) found that 80% of prey consisted of birds, especially marsh-dwelling songbirds such as blackbirds (Icteridae). There have been few studies of winter dietary habits in southwestern North America; voles (*Microtus*) and other rodents probably dominate the winter diet in southern California, although small birds are undoubtedly taken as well.

Foraging behavior and diet overlap considerably with the Short-eared Owl (*Asio flammeus*), although the latter species hunts more at dawn, dusk, and in darkness; each species has been noted robbing the other of prey (Berger, 1958; Bildstein and Ashby, 1975).

Northern Harriers are ground nesters, with the nest placed in dense, low ground cover in marshes or uplands; nests may sometimes be placed in croplands (MacWhirter and Bildstein, 1996). Both sexes collect nest material, but the female performs most of the nest building. Mean clutch size of 16 studies ranged from 3.7-5.5 eggs; only one clutch is laid per season (MacWhirter and Bildstein, 1996). The eggs are incubated for about 30 days, and the young fledge after about another 30 days (MacWhirter and Bildstein, 1996).

Breeding population densities in northern North American populations range from 0.8 nests per 10 km^2 to 19.5 nests per 10 km^2 (MacWhirter and Bildstein, 1996); the highest densities were noted in the northern Great Plains (Minnesota, North Dakota and Manitoba). Densities in cold desert shrublands of Utah and Idaho are considerably lower (<0.1 nests per 10 km^2). Breeding densities vary considerably from year to year, depending on prey availability (MacWhirter and Bildstein, 1996).

Habitat Requirements:

Northern Harriers breed in open wetlands, wet, lightly grazed pastures, fallow fields, dry uplands, prairies, agricultural lands, and cold desert shrub-steppe (MacWhirter and Bildstein, 1996); in western North America they are found more often in dry upland habitats than in the rest of the continent (MacWhirter and Bildstein, 1996). Breeding habitat in California consists of both coastal and freshwater marshlands, usually where there is adjacent upland vegetation of grasslands including saltgrass, pasturelands, native prairies, and montane meadows (Grinnell and Miller, 1944).

Migrants and wintering birds are somewhat broader in their range of occupied habitats, using both wetland habitats and a variety of upland habitats with low vegetation. Wintering birds in the desert regions occur mainly in agricultural areas (Garrett and Dunn, 1981), especially those dominated by alfalfa fields; they also occupy extensive marshes such as at Piute Ponds and Harper Dry Lake. Migrants in the deserts are widespread in open habitats, including marshes, grasslands, pastures, agricultural fields, saltbush scrub, and even creosote scrub.

Population Status:

Overall, North American populations have declined during the twentieth century, with the major causes being the extensive draining of wetlands, implementation of monoculture farming, and reforestation of open farmlands (MacWhirter and Bildstein, 1996). White (1994) considers this species of variable, but possibly decreasing trends in western North America, citing habitat alterations (particularly wetlands loss) as the most important cause of possible declines. Breeding Bird Survey and Christmas Bird Count

data suggest a decline in populations of the southwestern United States since the early 1960s (MacWhirter and Bildstein, 1996).

Threats Analysis:

The primary threat to breeding Northern Harriers in the WMPA is the loss of or disturbance to the few extensive marsh habitats in the region. The overall area of the freshwater marshes at Piute Ponds has increased with the completion of a Ducks Unlimited marsh project in the late 1980s.

Shooting and trapping has been a threat to this species in parts of its range, especially where birds congregate at communal roosts in winter (MacWhirter and Bildstein, 1996); no large communal roosts of harriers occur in California.

Organochloride pesticides contributed to a 19% reduction in eggshell thickness and mass in Northern Harriers of western North America (Anderson and Hickey 1972), probably leading to reproductive failures and population declines. Such effects and declines have largely been reversed with the reduction in the use of DDT (MacWhirter and Bildstein, 1996). Dieldrin, heptachlor epoxide, mercury, and lead have been found in harrier tissues, but not at levels threatening reproductive success (MacWhirter and Bildstein, 1996).

Habitat degradation appears to be an important factor in this species' decline in California (Remsen, 1978). Destruction of or disturbance to marshes and other wetlands, grasslands, and wet meadows negatively affect this species; burning, plowing, or disking of grasslands during the breeding season may cause breeding failures (Remsen, 1978). Disturbance at nest sites may reduce reproductive success in some areas; pairs nesting in hayfields or agricultural fields may fail due to disturbance or nest destruction by livestock or agricultural activities (MacWhirter and Bildstein, 1996).

Known predators of eggs and nestlings include feral dogs (*Canis familiaris*), coyotes (*C. latrans*), raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*), red foxes (*Vulpes fulva*), and Common Ravens (*Corvus corax*) (MacWhirter and Bildstein, 1996). All of these species have increased, have been introduced (feral dogs), or could potentially become established (red foxes) in areas of human activity in the WMPA, such as urban and suburban areas, ranches, and parks.

Biological Standards:

Wetlands preservation for waterfowl and habitat management for upland game birds may have a beneficial impact on Northern Harriers (MacWhirter and Bildstein, 1996). Such enhanced wetlands occur in the WMPA at sites such as Piute Ponds, Edwards Air Force Base. Habitat management resulting in extensive, undisturbed marshes and reedbeds will benefit harriers.

Harriers nesting in upland sites may benefit from the protection of habitats undisturbed by agricultural activities, livestock grazing, and recreational pressures; they may also benefit from the retention of annual growth through the breeding season. A reduction in or elimination of winter livestock grazing in wetland areas and grasslands may result in increased foraging success for harriers (MacWhirter and Bildstein, 1996).

Management of non-native predators and adaptable small to medium-sized carnivores (such as skunks and raccoons) may reduce predation at harrier nests; such

management is often accomplished, at least in part, by the maintenance of healthy populations of larger carnivores such as coyotes and mountain lions (*Felis concolor*), although an overabundance of coyotes may threaten harriers.

As for all raptors, continuing public education about the benefits of raptors and their legal protection is likely to benefit harriers.

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